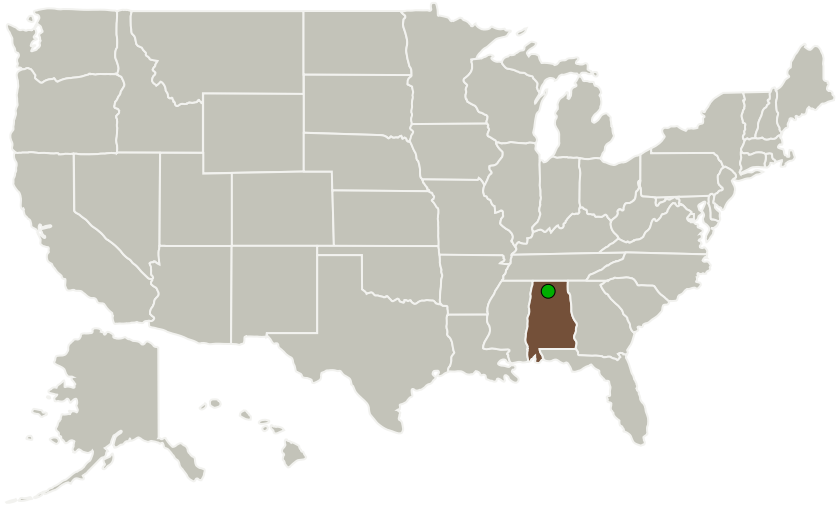
Additive Manufacturing of Telescope Mirrors, Phase I

Completed Technology Project (2016 - 2016)

Project Introduction

This Phase 1 SBIR is to demonstrate feasibility of using selective laser melting (SLM) to produce a 3-meter symmetrical radius of curvature (ROC) isogrid mirror substrate which will significantly reduce traditional mechanical machining of the mirror surface before and after nickel plating. The technique in accomplishing this is by fabricating the lens facesheet as the top most layers in the melting process. This way, our melting technique in producing the best possible finish on the lens surface SLM can provide. If this is successful, then performing a electro-polishing of the substrate before nickel plating the lens facesheet, single point diamond turning (SPDT) is the only time it is necessary. By developing the SLM techniques having a facesheet ROC with minimum variation, and having an optimized facesheet thickness designed for additive manufacturing, this substrate can be scaled to support flight hardware designs for UVOIR mirrors.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
ASRC Federal Astronautics, LLC	Lead Organization	Industry	Huntsville, Alabama
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

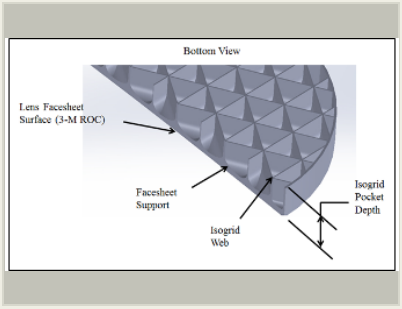


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Table of Contents

Additive Manufacturing of Telescope Mirrors, Phase I

Completed Technology Project (2016 - 2016)

Primary U.S. Work Locations
Alabama

Project Transitions

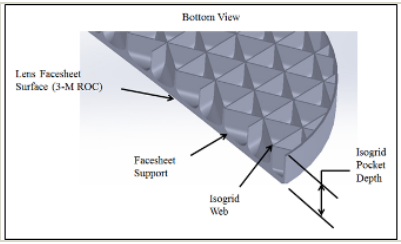
June 2016: Project Start

December 2016: Closed out

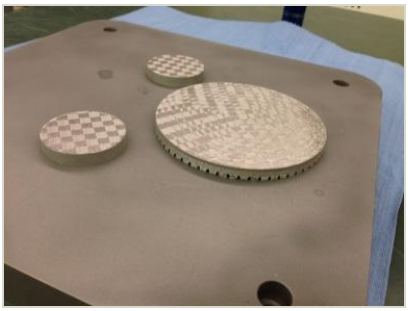
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139796)*

Images



Briefing Chart Image
Additive Manufacturing of Telescope Mirrors, Phase I
(https://techport.nasa.gov/image/136082)



Final Summary Chart Image
Additive Manufacturing of Telescope Mirrors, Phase I Project Image
(https://techport.nasa.gov/image/128383)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
ASRC Federal Astronautics, LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

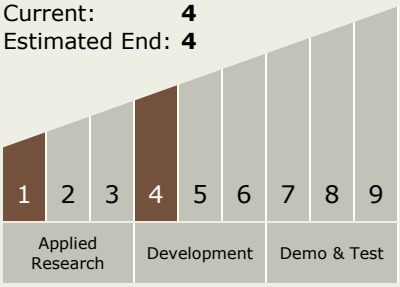
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Robert Harrison

Technology Maturity (TRL)

Start: **1**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.3 Optical Components

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System